

# **Zero Emissions: School Buses for the Future**

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Old diesel school buses urgently need to be replaced.  
The answer is clean and healthy, zero-carbon electric buses.

## Diesel exhaust is hazardous

- Diesel Exhaust Particles (DEPs) are recognized as a cancer-causing substance by the International Agency for Research on Cancer (IARC).<sup>1</sup>
- The chairman of the IARC Working Group stated that “[our] conclusion was unanimous: diesel engine exhaust causes lung cancer in humans.”
- DEPs are also associated with severe allergic asthma attacks.<sup>2</sup>
- Two additional components of diesel exhaust, nitrogen oxides (NO<sub>x</sub>)<sup>3</sup> and fine particulate matter (PM2.5) are implicated in triggering asthma attacks and causing cardiovascular diseases including heart attacks, high blood pressure, and strokes<sup>4</sup>.
- New studies are showing there is **no safe level of pollution**<sup>5</sup>, with deaths noted below the air quality standards currently deemed safe.
- Diesel, compressed natural gas (CNG), and propane buses all burn fossil fuels that accelerate climate change.

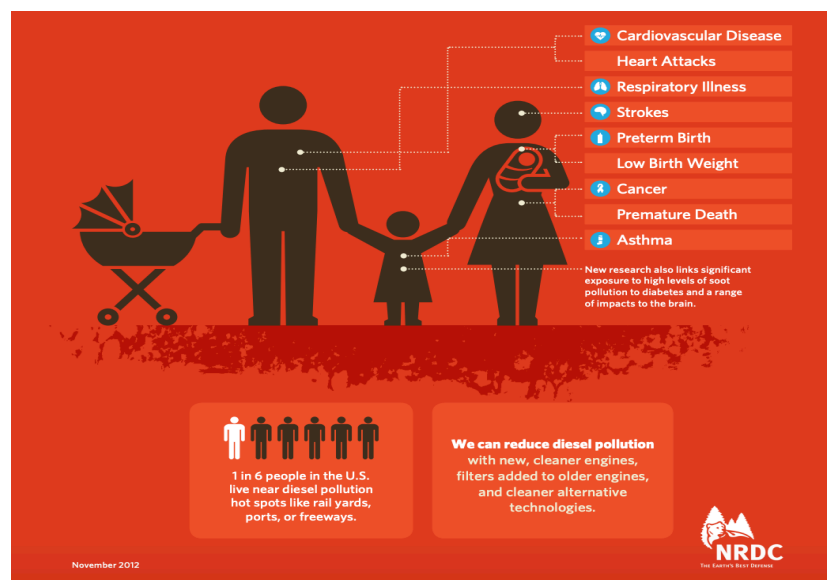


Fig .1: Reproduced from “How Diesel Exhaust Hurts your Health”, 2012, Retrieved July 31,2019 from <https://on.nrdc.org/2MBojUY>, Copyright NRDC, Courtesy: NRDC

## Children are especially at risk

- Children are more susceptible to pollution than adults due to their physiology. They take more breaths per minute, increasing their exposure to air pollutants.
- **NO<sub>x</sub>, a pollutant released when fossil fuels are burned, stunts the growth of children’s lungs,**<sup>6</sup> robbing them of a healthy future.

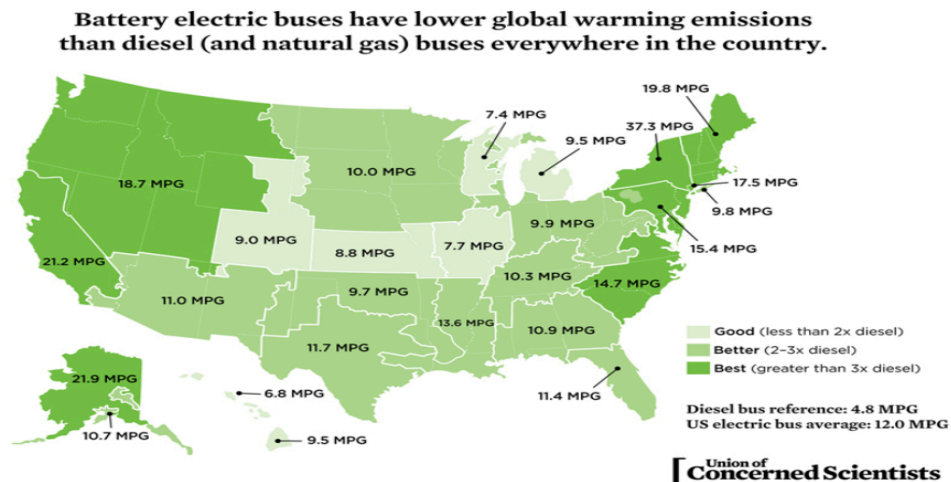
## Why focus on school buses?

- Multiple studies have shown that due to the design of school buses, **diesel exhaust concentrates inside the bus**, increasing children's exposure to pollutants, **a phenomenon known as "self-pollution"**.<sup>7,8</sup>
- **A study by the NRDC and the Coalition for Clean Air** showed that children inside a bus are exposed to exhaust in amounts "translating to 23 to 46 times the cancer risk level considered significant under federal law." Bus operators are also exposed.<sup>9</sup>
- **Idling school buses at pick-up zones increases the concentration of exhaust**,<sup>10</sup> and this may even be true for less polluting buses. Bus operators may intentionally idle their buses due to **misperceptions about vehicle maintenance**,<sup>11</sup> despite **extended idling being illegal in Minnesota and 16 other states**.<sup>12</sup>
- Children who use alternative forms of transportation, including biking and walking, are exposed to pollution at school bus pick-up zones, as are school staff.
- The risk of exposure to pollution is compounded in neighborhoods that already have poor outdoor air quality, perpetuating environmental injustice.

## Zero-emission buses: the clean & healthy choice

- **Switching to cleaner buses improves children's health**,<sup>13</sup> especially those with asthma and other sensitive populations.
- **Decreases in NO<sub>x</sub> levels translate to health benefits in real time**. Two studies done in California showed that decreasing NO<sub>x</sub> and ozone levels in communities **improved lung function**<sup>14</sup> and **reduced bronchitis episodes in children**.<sup>15</sup>
- A recent study in Georgia found that **cleaner buses resulted in improved aerobic capacity in children, and increased cognitive function**, as demonstrated by higher English language ability and math scores.<sup>16</sup>
- According to the Intergovernmental Panel on Climate Change special report,<sup>17</sup> it is imperative that we rapidly move away from fossil fuel use.
- **Studies are now calling into question whether natural gas is a cleaner alternative** to diesel when taking into account lifecycle emissions.<sup>18</sup> Propane and CNG are made from natural gas, which means their use would encourage dirty fracking for the lifetime of buses.

Fig. 2: Reproduced from "Electric vs. Diesel vs. Natural Gas: Which Bus is Best for the Climate?" 2014, retrieved July 31, 2019 from <https://bit.ly/2zSijm9>, Copyright & Courtesy: Union of Concerned Scientists.



## Electric buses save money and reduce pollution

- According to a report from the U.S. Public Interest Research Group Education Fund, **the lifetime fuel and maintenance savings of electric school buses are around \$170,000<sup>19</sup>.**
- **In its first year of use, a new electric bus saved \$799 compared with a new diesel bus in Lakeville, Minnesota.** As the technology is tested further and becomes more familiar, savings will likely be much higher.<sup>20</sup>
- Electricity prices fluctuate far less than diesel prices, providing stability for bus owners.
- Calculations by the Union of Concerned Scientists show that **everywhere in the country, electric buses produce less global warming emissions.<sup>21</sup> On grids with more renewable energy, such as in New York State, electric buses pollute less per mile than gas personal cars.**
- As our electric grid improves in the coming years, electric buses will become more efficient. During that same period, engines in diesel buses will become less efficient and pollute more.
- **Electric buses, especially when charged on a renewable and clean energy grid, are the clear winner.<sup>22</sup>**

## It's time for a clean bus transition in Minnesota

States and cities across the country, including California and Chicago, are making the transition to clean electric buses. The Chicago Transit Authority reported in 2014 that transitioning to electric buses reduces the incidence of illnesses and respiratory diseases, which is valued at \$55,000 annually per bus, or \$660,000 over the expected 12-year bus lifespan.<sup>23</sup>

Health Professionals for a Healthy Climate recommends that the Minnesota Pollution Control Agency use the Volkswagen settlement funds to lay the foundation for a healthy future for our children, future generations, and the planet.

Specifically, **we request full funding for electric school buses, with priority to districts with poor air quality and higher ozone-attributable asthma-related hospital visits.** Many of these buses should be fully funded with VW settlement money, as some school districts are unable to provide matching funds. **In the interest of public health, we strongly oppose funding any new fossil fuel vehicles.**

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